Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) ~~Method~~ A method for measuring degradations of a digitized image introduced when coding the image, said method ~~consisting~~ comprising the steps of:

dividing the image into coding blocks using a coding grid ~~and~~ ,

applying a coding processing on pixel data in each said block, making use of a block transform calculation and an inverse block transform calculation,

~~characterized in that it includes the following steps:~~

–determining ~~(11)~~ the coding grid of the coded image, in order to find ~~the~~ an image division into coding blocks, used when coding the image,

–shifting ~~(12)~~ the coding grid with respect to the coded image, so as to define an image division into analysis blocks ~~$(B_{i,j})$~~ each covering a boundary ~~(23)~~ between two adjacent coding blocks ~~(21, 22)~~,

–applying ~~(13)~~ the block transform calculation to pixel data ~~$(f_{i,j}(x,y))$~~ in the coded image using the shifted coding grid to obtain transformed coefficients ~~$(DC_{i,j}, AC_{i,j}(u,v))$~~ for each analysis block ~~$(B_{i,j})$~~ defined by the shifted coding grid,

–extracting ~~(14)~~ coefficients that could be affected by a block effect resulting from coding of the image, from the transformed coefficients,

–applying ~~(15)~~ the inverse block transform calculation to the extracted transformed coefficients to determine the pixel data ~~$(I_{i,j}(x,y))$~~ for each analysis block,

–for each analysis block, estimating ~~(17)~~ an indicator ~~($\upsilon_{i,j}$)~~ of the degradation due to block effects, using pixel data ~~($f_{i,j}(x,y)$)~~ in the coded image and pixel data ~~($I_{i,j}(x,y)$)~~ in each analysis block, obtained by the inverse transform calculation, and

–determining ~~(17)~~ an image degradation measurement ~~(υ)~~ by summing the degradation indicators ~~($\upsilon_{i,j}$)~~ of each analysis block.

2. (currently amended) ~~Method~~ The method according to claim 1, ~~characterized in that~~ wherein the estimation of a degradation indicator ~~($\upsilon_{i,j}$)~~ for each analysis block ~~($B_{i,j}$)~~ comprises the steps of:

–calculating an average of inter pixel differences ~~($\Delta I_{i,j}$)~~ at the inter block boundary ~~(23)~~ of the coding grid, covered by the analysis block, using pixel data ~~($I_{i,j}(x,y)$)~~ obtained for the analysis block,

–calculating an average ~~($\mu_{i,j}$)~~ and a standard deviation ~~($\sigma_{i,j}$)~~ applicable to pixels in the two adjacent blocks ~~(21, 22)~~ on the coding grid, partially covered by the analysis block,

–calculating a weighting factor ~~($w_{i,j}$)~~ as a function of the average and the standard deviation obtained for the analysis block, and

–calculating a spatial activity ~~($ACT_{i,j}$)~~ of the analysis block using spatial activities ~~($ACT^{G}_{i,j}$ $ACT^{D}_{i,j}$)~~ determined for each of the two adjacent blocks ~~(21, 22)~~ in the coding grid partially covered by the analysis block,

–the analysis block degradation indicator being determined as a function of the calculated average of inter pixel differences, the weighting factor and the spatial activity of the block.

3. (currently amended) ~~Method~~ The method according to claim 2, ~~characterized in that~~ wherein the analysis block degradation indicator $\upsilon_{i,j}$ is obtained using the following formula:

$$\upsilon_{i,j} = \frac{\Delta I_{i,j} w_{i,j}}{1 + \psi \left| ACT_{i,j} \right|}$$

in which $\Delta I_{i,j}$ is the average of inter pixel differences at the inter block boundary ~~(23)~~ of the coding grid covered by the analysis block, $w_{i,j}$ is the weighting factor, ψ is a predefined constant, and $ACT_{i,j}$ is the spatial activity of the analysis block.

4. (currently amended) ~~Method~~ The method according to ~~either~~ claim 2~~ or 3~~, ~~characterized in that~~ wherein the transform calculation is applied to coding blocks of the coded image, the spatial activities ~~$(ACT^G_{i,j}$ $ACT^D_{i,j})$~~ determined for each of the two coding blocks ~~(21, 22)~~ being obtained from the transformed coefficients ~~$(DC_{i,j}, AC_{i,j}(u,v))$~~ for each of the two coding blocks.

5. (currently amended) ~~Method~~ The method according to claim 4, ~~characterized in that~~ wherein the spatial activities ~~$(ACT^G_{i,j}$ $ACT^D_{i,j})$~~ determined for each of the two coding blocks ~~(21, 22)~~ are obtained from the following formulas:

$$ACT^G_{i,j} = \frac{1}{1 + DC^G_{i,j}} \sqrt{\sum_{\substack{u,v=0 \\ u+v\neq 0}}^{7} \left[AC^G_{i,j}(u,v) Nill(u,v) \right]^2}$$

$$ACT^D_{i,j} = \frac{1}{1 + DC^D_{i,j}} \sqrt{\sum_{\substack{u,v=0 \\ u+v\neq 0}}^{7} \left[AC^D_{i,j}(u,v) Nill(u,v) \right]^2}$$

in which $DC^{G}_{i,j}$ and $AC^{G}_{i,j}(u,v)$ and $DC^{D}_{i,j}$ and $AC^{D}_{i,j}(u,v)$ are the transformed coefficients for each of the two adjacent coding blocks ~~(21, 22)~~ partially covered by the analysis block, and Nill(u,v) is a masking function modelling masking by neighbourhood.

6. (currently amended) ~~Method~~ The method according to ~~one of claims~~ claim 2~~ to 5~~, ~~characterized in that~~ wherein the average ~~$(\mu_{i,j})$~~ and standard deviation ~~$(\sigma_{i,j})$~~ calculated for each analysis block ~~$(B_{i,j})$~~ are determined from transformed coefficients ~~$(DC_{i,j}, AC_{i,j}(u,v))$~~ for each of the two adjacent coding blocks ~~(21, 22)~~ partially covered by the analysis block.

7. (currently amended) ~~Method~~ The method according to ~~one of claims~~ claim 2~~ to 6~~, ~~characterized in that~~ wherein the weighting factor ~~$(w_{i,j})$~~ is obtained by the following formula:

$$w_{i,j}(\mu_{i,j},\sigma_{i,j},\zeta) = \begin{cases} \lambda \ln\left(1+\dfrac{\sqrt{\mu_{i,j}}}{1+\sigma_{i,j}}\right) \text{if } \mu_{i,j} \le \zeta \\ \ln\left(1+\dfrac{\sqrt{255-\zeta}}{1+\sigma_{i,j}}\right) \text{else,} \end{cases}$$

in which $\lambda = \dfrac{\ln\left(1+\dfrac{\sqrt{255-\zeta}}{1+\sigma_{i,j}}\right)}{\ln\left(1+\dfrac{\sqrt{\zeta}}{1+\sigma_{i,j}}\right)}$

$\mu_{i,j}$ and $\sigma_{i,j}$ are the average and standard deviation respectively calculated for each analysis block ~~$(B_{i,j})$~~ and ζ is a parameter corresponding to the maximum sensitivity of the human eye.

8. (currently amended) ~~Method~~ The method according to ~~one of claims~~ claim 1~~ to 7~~, ~~characterized in that~~ further comprising a prior selection step of selection of analysis blocks that could contain a block effect ~~are selected~~ before estimating a degradation indicator ~~$\upsilon_{i,j}$~~ for each analysis block ~~$(B_{i,j})$~~.

9. (currently amended) ~~Method~~ The method according to claim 8, ~~characterized in that~~ wherein the prior selection step comprises a step ~~consisting~~ of separating analysis blocks ~~$(B_{i,j})$~~ for which the extracted transformed coefficients are greater than a predetermined threshold.

10. (currently amended) ~~Method~~ The method according to ~~either~~ claim 8~~ or 9~~, ~~characterized in that~~ wherein the prior selection step comprises a step ~~consisting~~ of selecting analysis blocks ~~$(B_{i,j})$~~ with pixels ~~$(I_{i,j}(x,y))$~~ with an energy representing a significant proportion of the energy of the block, at the inter block boundary ~~(23)~~ of the coding grid covered by the analysis block.

11. (currently amended) ~~Method~~ The method according to ~~one of claims~~ claim 1~~ to 10~~, ~~characterized in that~~ wherein the coding grid is shifted horizontally with respect to the coded image.

12. (currently amended) ~~Method~~ The method according to ~~one of claims~~ claim 1~~ to 11~~, ~~characterized in that~~ wherein the coding grid is shifted vertically with respect to the coded image.

13. (currently amended) ~~Method~~ The method according to ~~one of claims~~ claim 1~~ to 12~~, ~~characterized in that~~ wherein the block

transform calculation is a discrete cosine transform calculation.

14. (currently amended) ~~System~~ A system for measuring degradations of a digitized image introduced when coding the image, ~~characterized in that it comprises~~ said system comprising calculation means for ~~implementing the method according to one of claims 1 to 13~~ :

dividing the image into coding blocks using a coding grid,

applying a coding processing on pixel data in each block, making use of a block transform calculation and an inverse block transform calculation,

determining the coding grid of the coded image, in order to find the image division into coding blocks, used when coding the image,

shifting the coding grid with respect to the coded image, so as to define an image division into analysis blocks each covering a boundary between two adjacent coding blocks,

applying the block transform calculation to pixel data in the coded image using the shifted coding grid to obtain transformed coefficients for each analysis block defined by the shifted coding grid,

extracting coefficients that could be affected by a block effect resulting from coding of the image, from the transformed coefficients,

applying the inverse block transform calculation to the extracted transformed coefficients to determine the pixel data for each analysis block,

for each analysis block, estimating an indicator of the degradation due to block effects, using pixel data in the coded image and pixel data in each analysis block, obtained by the inverse transform calculation, and

determining an image degradation measurement by summing the degradation indicators of each analysis block.

15. (new) The system according to claim 14, wherein the calculation means for estimating a degradation indicator for each analysis block comprises means for:

calculating an average of inter pixel differences at the inter block boundary of the coding grid, covered by the analysis block, using pixel data obtained for the analysis block,

calculating an average and a standard deviation applicable to pixels in the two adjacent blocks on the coding grid, partially covered by the analysis block,

calculating a weighting factor as a function of the average and the standard deviation obtained for the analysis block, and

calculating a spatial activity of the analysis block using spatial activities determined for each of the two adjacent blocks in the coding grid partially covered by the analysis block,

the analysis block degradation indicator being determined as a function of the calculated average of inter pixel differences, the weighting factor and the spatial activity of the block.

16. (new) The system according to claim 15, wherein the analysis block degradation indicator $\upsilon_{i,j}$ is obtained using the following formula:

$$\upsilon_{i,j} = \frac{\Delta I_{i,j} w_{i,j}}{1 + \psi \left| ACT_{i,j} \right|}$$

in which $\Delta I_{i,j}$ is the average of inter pixel differences at the inter block boundary of the coding grid covered by the analysis block, $w_{i,j}$ is the weighting factor, ψ is a predefined constant, and $ACT_{i,j}$ is the spatial activity of the analysis block.

17. (new) The system according to claim 15, wherein the transform calculation is applied to coding blocks of the coded image, the spatial activities determined for each of the two coding blocks being obtained from the transformed coefficients for each of the two coding blocks.

18. (new) The system according to claim 17, wherein the spatial activities determined for each of the two coding blocks are obtained from the following formulas:

$$ACT_{i,j}^{G} = \frac{1}{1+DC_{i,j}^{G}} \sqrt{\sum_{\substack{u,v=0 \\ u+v\neq 0}}^{7} \left[AC_{i,j}^{G}(u,v)Nill(u,v)\right]^{2}}$$

$$ACT_{i,j}^{D} = \frac{1}{1+DC_{i,j}^{D}} \sqrt{\sum_{\substack{u,v=0 \\ u+v\neq 0}}^{7} \left[AC_{i,j}^{D}(u,v)Nill(u,v)\right]^{2}}$$

in which $DC_{i,j}^{G}$ and $AC_{i,j}^{G}(u,v)$ and $DC_{i,j}^{D}$ and $AC_{i,j}^{D}(u,v)$ are the transformed coefficients for each of the two adjacent coding blocks (partially covered by the analysis block, and Nill(u,v) is a masking function modelling masking by neighbourhood.

19. (new) The system according to claim 15, wherein the average and standard deviation calculated for each analysis block are determined from transformed coefficients for each of the two adjacent coding blocks partially covered by the analysis block.

20. (new) The system according to claim 15, wherein the weighting factor $w_{i,j}$ is obtained by the following formula:

$$w_{i,j}(\mu_{i,j},\sigma_{i,j},\zeta) = \begin{cases} \lambda \ln\left(1+\dfrac{\sqrt{\mu_{i,j}}}{1+\sigma_{i,j}}\right) \text{if } \mu_{i,j} \le \zeta \\ \ln\left(1+\dfrac{\sqrt{255-\zeta}}{1+\sigma_{i,j}}\right) \text{else,} \end{cases}$$

in which $\lambda = \dfrac{\ln\left(1+\dfrac{\sqrt{255-\zeta}}{1+\sigma_{i,j}}\right)}{\ln\left(1+\dfrac{\sqrt{\zeta}}{1+\sigma_{i,j}}\right)}$

$\mu_{i,j}$ and $\sigma_{i,j}$ are the average and standard deviation respectively calculated for each analysis block and ζ is a parameter corresponding to the maximum sensitivity of the human eye.

21. (new) The system according to claim 14, further comprising prior selection means for selecting analysis blocks that could contain a block effect, before estimating a degradation indicator for each analysis block.

22. (new) The system according to claim 21, wherein the prior selection means comprise means for separating analysis blocks for which the extracted transformed coefficients are greater than a predetermined threshold.

23. (new) The system according to claim 21, wherein the prior selection means comprise means for selecting analysis blocks with pixels with an energy representing a significant proportion of the energy of the block, at the inter block boundary of the coding grid covered by the analysis block.

24. (new) The system according to claim 14, wherein the coding grid is shifted horizontally with respect to the coded image.

25. (new) The system according to claim 14, wherein the coding grid is shifted vertically with respect to the coded image.

26. (new) The system according to claim 14, wherein the block transform calculation is a discrete cosine transform calculation.